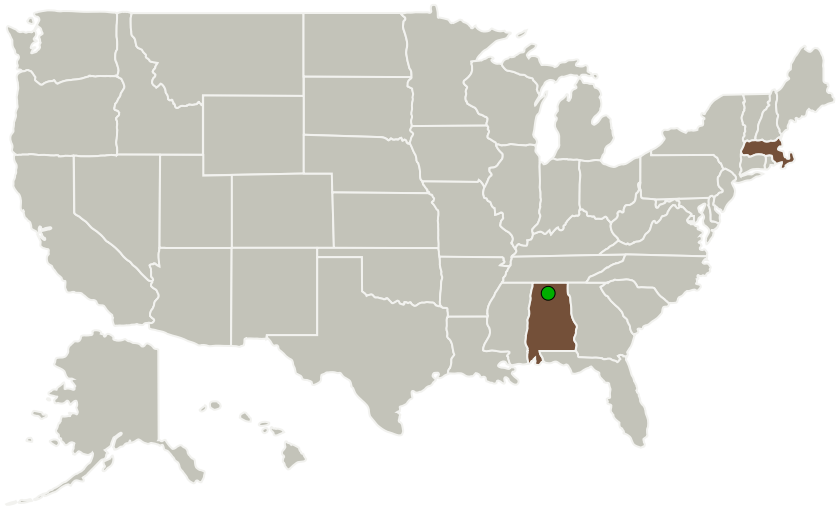
A Compact, Dual Excitation Raman Probe and Instrument for the Identification of Lunar Samples, Phase II

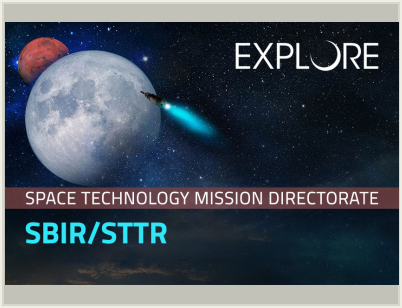
Completed Technology Project (2011 - 2013)

Project Introduction

NASA's Vision for Space Exploration advocates a return to the moon and involves a pl an of using the moon as a base of for missions to other planets. Early return missions to the moon will involve lunar exploration with robotic spacecrafts with instrumental payloads for scientific measurements of lunar surface features such as rocks, soil, and minerals. These instrument payloads will be helpful in identifying lunar resources that can be used in establishing extended human presence. Raman spectroscopy has been actively investigated as a lunar as well as a Mars surface robotic investigative tool for minerals. Current Raman instruments for space exploration utilize a single excitation wavelength, with a laser in the near-infrared (IR) to minimize fluorescence background. The goal of this project is to employ a dual excitation (visible and near-IR lasers) Raman instrument to minimize background emission. To achieve this goal, a dual excitation wavelength fiber optically coupled Raman probe head and a compact wide spectral range echelle spectrograph were demonstreated in Phase I. Phase II will integrate the probe into a compact instrument for mineralogical analysis capable of deployment on a rover-type of vehicle.

Primary U.S. Work Locations and Key Partners





A Compact, Dual Excitation Raman Probe and Instrument for the Identification of Lunar Samples, Phase II

Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	3
Technology Areas	3
Target Destinations	3

A Compact, Dual Excitation Raman Probe and Instrument for the Identification of Lunar Samples, Phase II

Completed Technology Project (2011 - 2013)

Organizations Performing Work	Role	Type	Location
EIC Laboratories, Inc.	Lead Organization	Industry	Norwood, Massachusetts
Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

Primary U.S. Work Locations	
Alabama	Massachusetts

Project Transitions

June 2011: Project Start

September 2013: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138609)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

EIC Laboratories, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Job Bello

Co-Investigator:

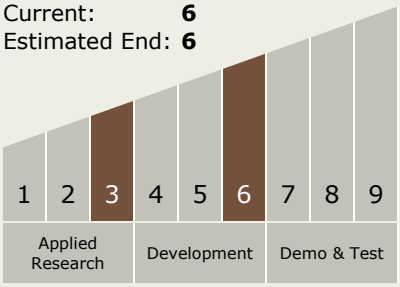
Job Bello

A Compact, Dual Excitation Raman Probe and Instrument for the Identification of Lunar Samples, Phase II

Completed Technology Project (2011 - 2013)

Technology Maturity (TRL)

Start: **3**
Current: **6**
Estimated End: **6**



Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.3 In-Situ Instruments and Sensors
    - TX08.3.2 Atomic and Molecular Species Assessment

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System